

EXCAVATIONS AT TE PANE O HOROIWI (N42/365), ST HELIERS, AUCKLAND

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Abstract. The January 1982 excavation of a portion of the upper platform of the pa, Te Pane o Horoiwi, N42/365, at St Heliers, Auckland, is reported. Excavation established a sequence of activities: an initial period concerned with the building of defensive works around the perimeter of the citadel, the construction of a series of drainage ditches, the digging of a sequence of intercutting pits, and the construction of further defensive works and structures.

Excavation on one of the terraces revealed limited evidence of habitation but no evidence of defences. Lack of traditional evidence relating to occupation of this headland after 1750 suggests that the site was a stronghold of the Waiohina people prior to this date.

The pa, N42/365, at St Heliers, Auckland, was first recorded in 1978. The site is situated on the north-west rim of the St Heliers crater now known as Glover Park (Figs.1,2). Initial research into the site was carried out by Lady Aileen Fox, including the preparation of a plan, in conjunction with L. Diamond, on which Fig. 3 is based.

The owners of a private property applied to the Auckland City Council for a building permit to erect a house, which would destroy a portion of the pa. Archaeological excavation in January and February 1982 was carried out following application to the New Zealand Historic Places Trust to modify the site (Permit 1981/51).

The New Zealand Archaeological Association's files record a number of archaeological sites in the vicinity of the St Heliers crater (Fig.2). There are three groups of sites currently visible around the crater rim (N42/363, 364, 365). These have been allotted separate site record numbers although it is possible that occupation may have been continuous around the whole of the crater rim and slopes.

With the exception of two excavations, for which there are no published reports, archaeological investigations in this part of Auckland have been minimal. A salvage excavation took place on Taylor's Hill (N42/89) in 1955 prior to quarrying of part of the cone (referred to in Davidson 1978:6). A small salvage excavation was carried out by L. and H. Birks of part of the southern ditch of N42/365 in 1957 prior to destruction for housing subdivision. The approximate location of this excavation is shown on Fig. 3. Excavation revealed that the ditch was 1.2 m deep, rising to a height of 1.8 m to the top of the scarp and 2.1 m wide at its base. The base of the ditch was flat and there was no bank on the top of the inner scarp. The inner wall of the ditch consisted of a "hard cap"; in this *ko* marks were visible (L. and H. Birks, pers.comm.).



Fig. 1. Location of N42/365 — Te Pane o Horoiwi, Auckland.

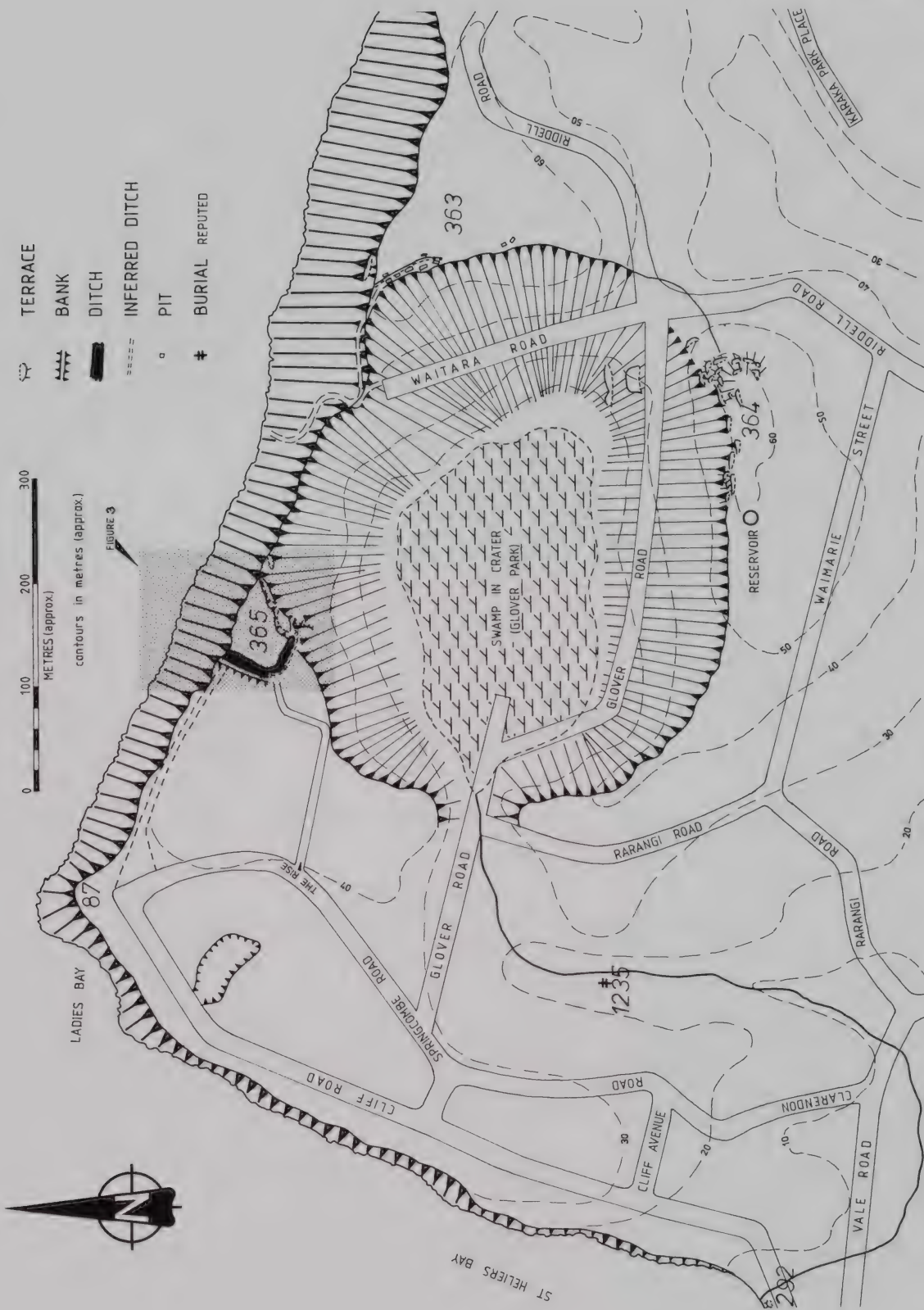


Fig.2. Sites in the vicinity of St. Heliers Crater, Auckland (compiled by C.A. Phillips).

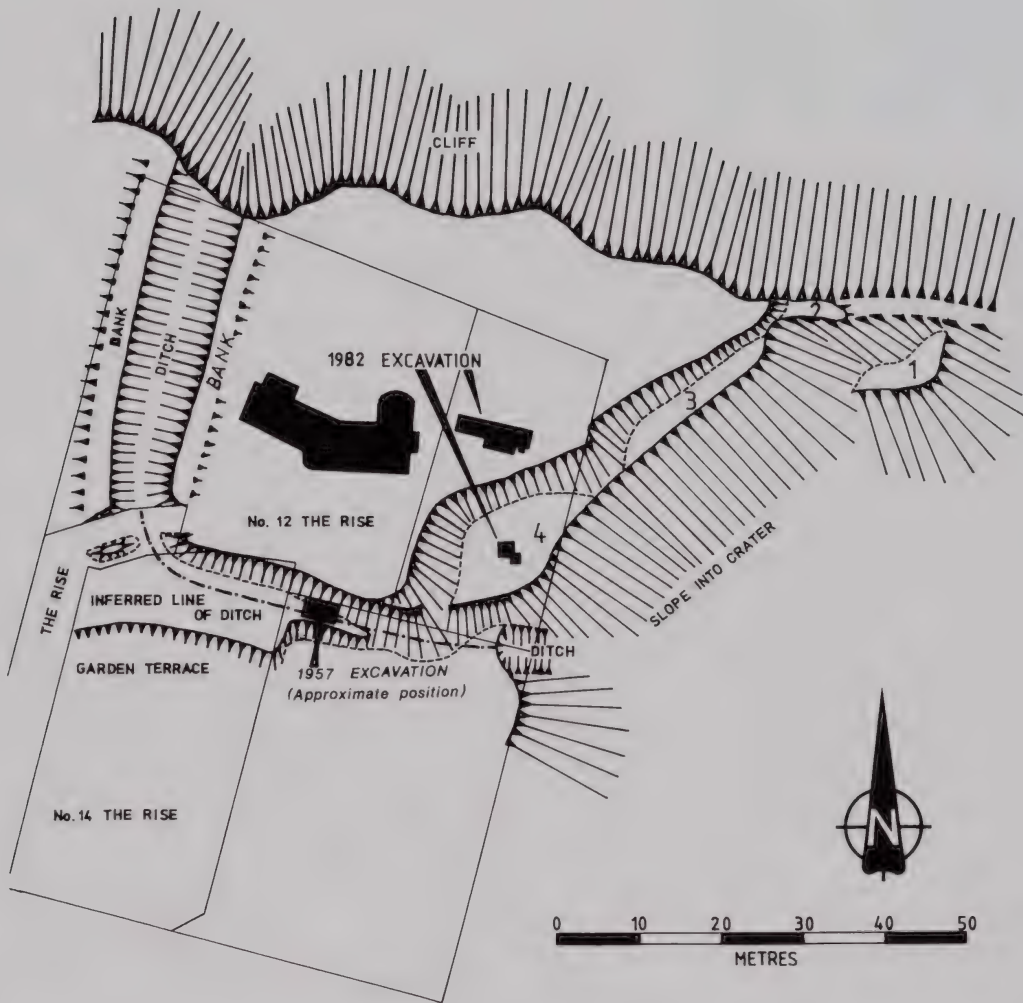


Fig.3. Te Pane o Horoiwi — platform of the citadel with location of the 1982 excavation (after map of L. Diamond).

The aim of the present investigation was to aid in the reconstruction of the sequence of occupation of this part of the Auckland isthmus. It was also hoped that excavation of a portion of the citadel would add to the present information as to the construction of this type of fortification. Material from this excavation has been lodged in the Auckland Institute and Museum.

MAORI TRADITION

Traditional Tainui history connects the initial naming and settlement of the land at the mouth of the Tamaki River to chiefs on board the Tainui canoe (Kelly 1949:52). There is considerable uncertainty over the names of sites at the entrance to the Tamaki River. A detailed analysis of the traditional material can be found in a report to the

New Zealand Historic Places Trust (Sewell 1984). Briefly the locality of site N42/365 appears to have been referred to by a number of names including Taurere and Whakamuhu. However Te Pane o Horoiwi is a name that has only been used to refer to N32/365, hence its name in this paper. There are no published accounts of a pa on this headland by the Ngati Whatua people and it is possible that it was occupied prior to settlement of the isthmus by these people. However, early ethnographic accounts do refer to people living at or near the entrance to the Tamaki River (Cruise 1974, D'Urville in Holloway 1962). Cruise (1974:213) recorded in his journal of 1820 that the *Dromedary* anchored between Motukoria and the mainland and that crew members visited some villages on shore "where we were met by a great number of natives". These reports suggest that in the 1820s the entrance to the Tamaki River was well populated although the exact location of settlements is not known.

THE LANDSCAPE

Te Pane o Horoiwi lies on the margin of the Waitemata strata that forms the high ground of the Auckland isthmus. The St Heliers crater was formed by a single explosive eruption forming a crater and tuff ring on the present coastline. The volcano has suffered greatly from erosion, waves having eroded the seaward flank of the cone and exposed the crater, and surface erosion washing away most of the remaining tuff deposit (Searle 1981:135). Remains of the tuff ring are visible to the south and east of the crater. The soil on the terraces (N42/364) on the southern slopes of the crater consists of brown friable volcanic derived loams.

The citadel platform of Te Pane o Horoiwi forms the boundary of the Waitemata sediment and the edge of the tuff ring of the St Heliers crater. In the area excavated there was no volcanic tuff, Waitemata sediment lay immediately beneath the topsoil (or at least beneath the cultural layers).

The choice of the St Heliers headland for a fortified site was possibly influenced by its strategic position. As a lookout the headland commanded views of the Rangitoto Channel and Tamaki Strait, close to a beach with safe landing for canoes. The shellfish species present in the midden indicate that the local foreshore was extensively exploited. The occurrence of terraces with midden incorporated into the brown friable loams suggests these may have been used for horticultural purposes. Evidence from another cone pa in the Auckland area indicates that extensive cultivations existed on the volcanic soils surrounding the cones with considerable habitations (reflected by shell midden and evidence of structures) among the gardens (Davidson 1978:6). It is likely, therefore, that occupation of Te Pane o Horoiwi, being a cone pa as well as a headland pa, followed similar lines.

THE SITE

The citadel of Te Pane o Horoiwi is situated on the north-western rim of the St Heliers crater and consists of a level platform of 2500 m². Some 50 m above sea level, this platform stands above all other features and is surrounded on two sides by natural cliffs, with earth work defences on the remaining sides (Fig.3). There were four terraces visible on the south-eastern slopes in 1978 as indicated in the Diamond map

from which Fig.3 is taken. Terraces 1 and 2 on Fig.3 were no longer visible in 1982. Terraces 1-4, consisting of artificially levelled areas rising by way of a scarp to the upper platform, could have been defended by palisading during occupation of the pa and could have formed part of the defences.

A defensive ditch was present originally along its western and southern sides (as indicated in Fig.3). The western portion of the ditch still extant contains the remnants of an inner bank. In 1978 Fox and Diamond noted an outer bank to the ditch (Fig.3). When the site was revisited in 1982 the remains of the outer bank were no longer visible. An 1899 photograph of the headland (Fig.4) shows the ditch on the southern slopes clearly visible. Much of the southern portion of the ditch was destroyed by housing development (discussion with local residents). The remaining portion of the southern ditch which was visible in 1978 has since been destroyed.

EUROPEAN MODIFICATION

The elevated portion of the tuff ring on which the citadel of Te Pane o Horoiwi is situated has been extensively modified in the past 50 years through the formation of private roads, the building of dwellings and landscaping for gardens. The swamp in the explosion crater of the volcano was developed into a public park which has necessitated considerable earthmoving. In addition some natural erosion has occurred in the form of crumbling away of the cliff edge.



Fig.4. Te Pane o Horoiwi from the east in 1899. Photo: H. Boscawen (Auckland Institute & Museum).

THE EXCAVATION

Excavation on Te Pane o Horoiwi consisted of a trench on the platform and a small area on Terrace 4, the locations of which are shown on Fig.3. A trench 10 x 2 m, aligned east to west, was opened up on the platform. As excavation progressed it was further extended towards the south. An area of 2.75 m² was excavated on Terrace 4. A total of 27.25 m² was excavated.

The turf and about 50 mm of topsoil and modern garden soil below it were removed by spade. Trowels were used for the remainder of the excavation with the exception of the extreme south-eastern corner of the trench which was spaded out. This latter area consisted of a build-up of midden with clay and European rubbish which had been placed on the edge of the south-eastern slope over the last 50 years.

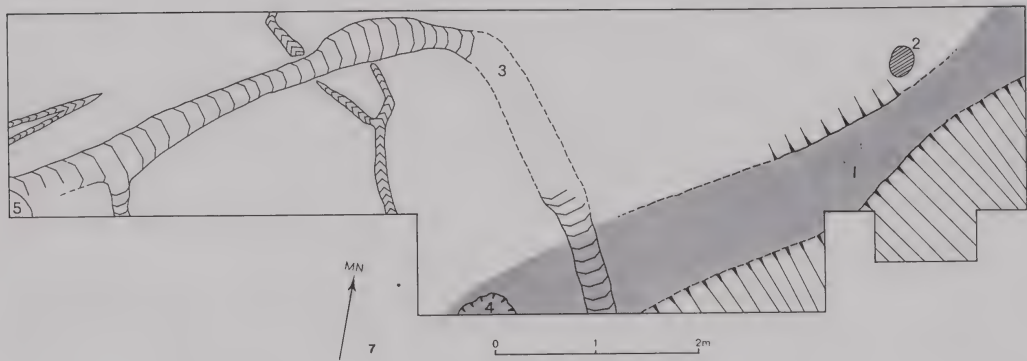
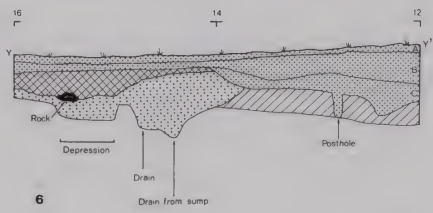
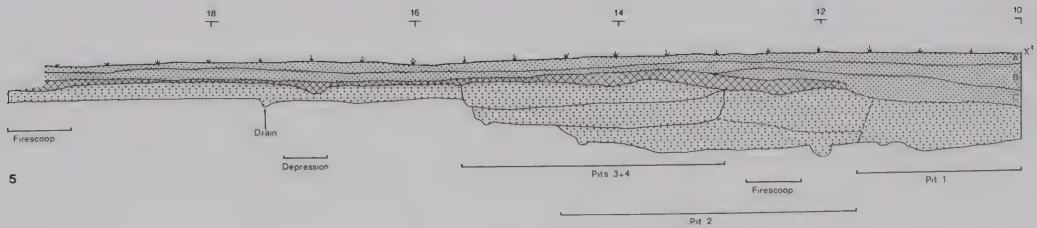
The trench on the Platform










Although only a small area on the upper platform was excavated, the stratigraphy indicated repeated use of the platform and demonstrated several major changes in the character of occupation. Figs.5 and 6 of the northern and southern cross-sections show the deposition of layers. The stratigraphy was as follows.

- Layer 1. Turf zone and topsoil, up to 700 mm in depth.
2. Midden layer varying in depth from 50-150 mm. This layer covered the excavated area with the exception of the eastern portion of the trench where it was cut by modern disturbance.
3. Redeposited weathered Waitemata sediment varying from 200-800 mm in depth.
4. Natural — weathered Waitemata sediment (a yellow-orange clay-like deposit).

Excavation revealed several periods of activity during the Maori occupation of the platform. These periods of activity can be interpreted as the building of structures followed by in-filling and levelling of the living area prior to construction of further structures. As there were no trapped A or B soil horizons between the majority of these periods it is likely that one period followed the previous one over a relatively short time span.

The earliest activity consisted of the construction of defensive works. The platform was naturally protected by cliffs on the northern side and there was a defensive ditch on the western and southern sides. The eastern side had a more gradual natural slope. The earliest activity consisted of the building up of the natural scarp to the south-east by the addition of material, thus forming a bank and increasing the height of the scarp by 600 mm. It is likely that the natural slope was also steepened at the same time (although this was not revealed on excavation) and the material removed was used to form the bank.



-  Drain
-  Posthole
-  Feature number
-  Area covered by bank
-  A — Topsoil
-  B — 1970 fill
-  C — 1930 fill
-  Midden
-  Layer 3
-  Layer 4 bank fill

Figs.5-7. Excavation on the Platform. 5. Northern Cross-section at N6. Section x - x'. 6. Southern Cross-section at N3. Section y - y'. 7. Ground plan showing features from first and second periods of activity.

The bank and a posthole was associated with Period 1 (Fig.7). The bank (Feature 1) was composed of three layers: a hard capping of weathered Waitemata sediment, a layer of brown soil 220 mm in depth, and a layer of weathered Waitemata sediment which measured 350 mm at its greatest depth.

A posthole (Feature 2) is the earliest feature from Period 1 and only became noticeable at a depth of 900 mm from the surface. It was 950 mm deep, 710 mm of which were cut into the natural layer below the bank at an angle of 40-50°.

There were three features associated with the second period of activity (Fig.7). These features were constructed following disuse of the defensive features of Period 1.

A drain complex (Feature 3) covered the western half of the excavated area, truncating the bank. The depth of the drains ranged from 50-100 mm. The central portion of the main drain was truncated by the construction of a pit from Period 3. The levelling of the platform prior to occupation in Period 3 resulted in the entire area being covered with redeposited Waitemata sediment. It is probable that the drains running at an angle to the main drain were originally connected to it. The purpose of the drain complex would have been to remove excess surface water by diverting it to the edge of the southern scarp, possibly relating to a structure beyond the extent of this excavation.

Feature 4 was a depression 250 mm deep filled with light brown soil with flecks of charcoal. A second depression (Feature 5) containing a concentration of charcoal, could have been a small firescoop.

Following occupation in Period 2 the area of the platform to the interior of the bank was filled in, almost to the top of the bank. This action brought the living floor in Period 3 to the top of the bank.

In the portion of the platform excavated the majority of the features relating to Period 3 were concerned with the storage of food. Excavation revealed a sequence of four superimposed pits (Fig.8). The features from Period 3 were as follows.

Pit 1 is probably the earliest pit from this period although the digging of later features resulted in very little of its outline remaining. In the base of the pit alongside the western and southern walls was a small drainage channel 50 mm wide and 30-40 mm deep. Fill consisted of brown soil mixed with redeposited Waitemata sediment.

Pit 2 was a flat-based pit with a drain 50 mm wide and 50-100 mm deep in the floor close to the walls. The southern wall sloped out slightly from the base of the pit. In the floor was a posthole, 220 mm in diameter, cut into the natural Waitemata sediment to a depth of approximately 150 mm suggesting the pit was roofed. The pit was filled with up to 250 mm of brown soil. The remainder of the fill was similar to the fill of Pit 1.

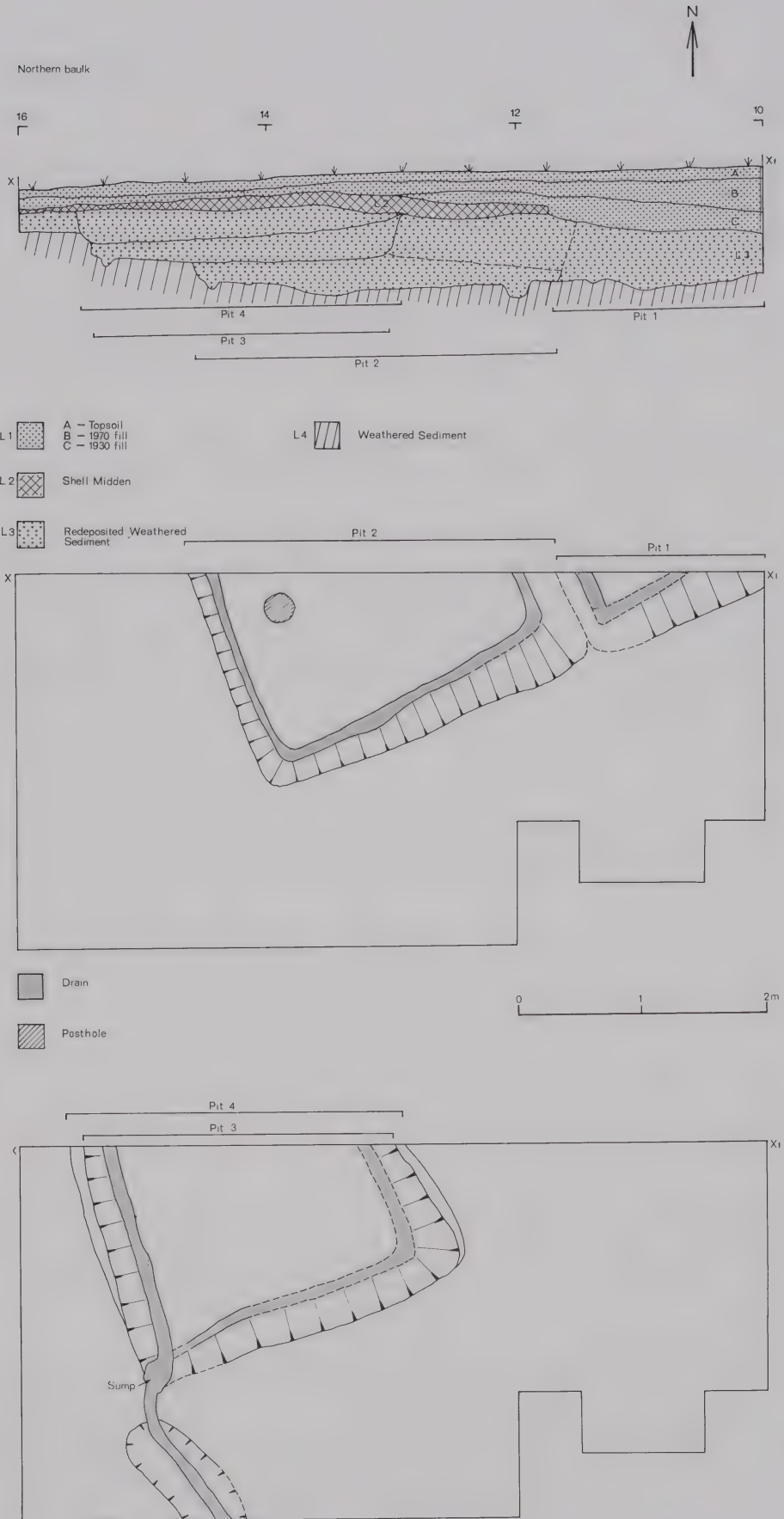


Fig.8. Excavation on the Platform. Ground plans and cross-section of pits in third period of activity.

Pit 3 was of similar dimensions and alignment to Pit 2, approximately 1 m further to the west. Floor drains were present alongside the western and part of the southern walls. In the south-western corner the floor drains led into a sump hole dug through the redeposited Waitemata sediment. Leading out of the sump was a further drain sloping towards the edge of the southern scarp.

Pit 4 was of similar dimensions and alignment to Pit 3. During excavation the outline of this pit was often difficult to follow, primarily due to the similar nature of both the deposit into which the pits were dug and the pit fills. However parts of the southern and eastern walls of this pit were traced and it is clearly visible in the northern cross-section (Fig.5).

The evidence from Period 3 suggests repeated use of this portion of the upper platform for storage. Each pit was filled prior to the digging of the next pit. This policy resulted in the platform remaining level with the top of the bank from Period 1. The evidence suggests features from Period 4 were constructed soon after the infilling of the final pit. During use of pits from Period 3 no features were constructed in the western portion of the area excavated.

The features from the fourth period of activity were all dug into the shell midden — Layer 2. It is postulated that, following the third period of activity, a large quantity of shell was spread over the entire area in order to form a living floor. This layer consisted predominantly of broken cockle shells within an ashy matrix which also contained some sand and sandstone pieces.

Features from Period 4 were dug through, and the majority filled with, midden. Thirty features relate to this period of activity (Fig.9). Postholes from this period can be considered in three groups.

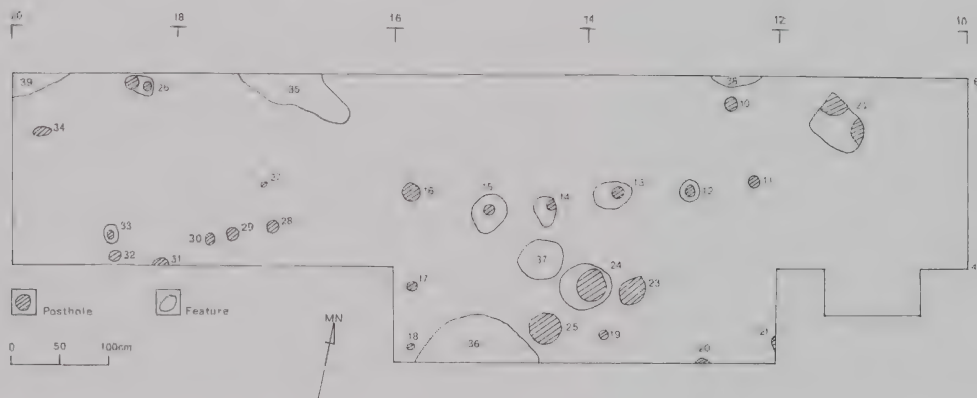


Fig.9. Excavation on the Platform. Ground plan of features from fourth period of activity.

1. Those relating to a single structure (Features 26-34), possibly a house or other building, in the western portion of the excavated area.
2. Those concerned with primary defence on the edge of the platform, i.e. palisade posts (Features 22-25).
3. A third group of postholes (Features 10-21). Features 11-16 were of similar depth and size. All these features were filled with midden from Layer 2.

Excavation on Terrace 4

On Terrace 4, 2.75 m² was excavated in order to determine whether defensive works occurred in this area as well as on the upper platform (Fig.3). Stratigraphy was as follows.

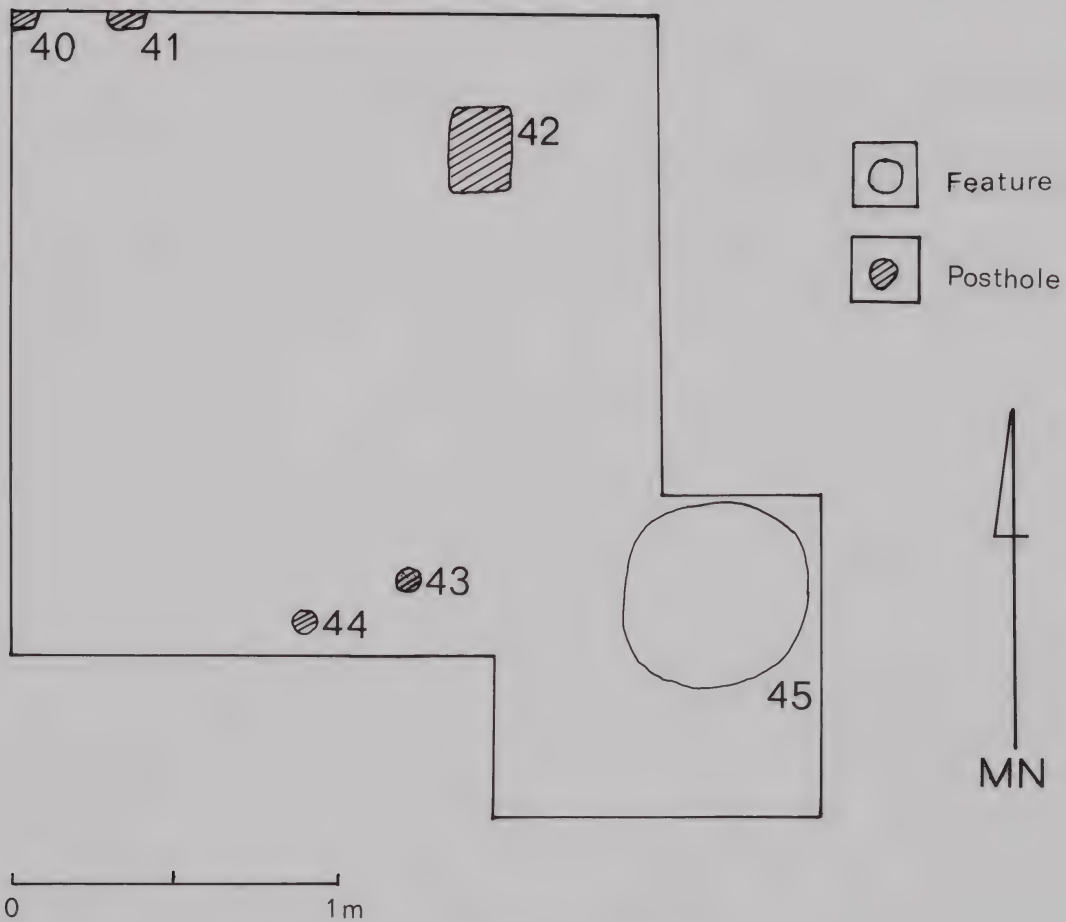


Fig.10. Excavation on Terrace 4. Ground plan of features.

- Layer 1. Topsoil and European midden, including nails, glass, pottery, tins, etc., mixed with shell midden in a very disturbed state.
2. Predominantly prehistoric shell midden but some intrusion of European rubbish.
 3. Dark brown soil with a scattering of midden.
 4. Natural — weathered Waitemata sediment.

Excavation revealed six features (Fig.10). Features 40-44 were postholes or stakeholes, all probably relating to a structure of recent historic origin. Feature 45 was a scoop 600 mm in diameter, cut into Layer 4. All features were filled with shell midden.

Midden was not analysed from Terrace 4. One obsidian flake and two sandstone pieces were found within Layer 2 on Terrace 4.

MIDDEN ANALYSIS FROM EXCAVATION ON PLATFORM

The midden material analysed represents deposits associated with Period 4 only. Column samples covering 3.5m² on the platform and a grab sample (approximately one quarter of Feature 45) were taken.

The shellfish content of the midden was overwhelmingly of the soft shore species, mostly small cockle and pipi — see Table 1.

Table 1. Percentages of total shells analyses.

Species	Percentage of total
<i>Chione stutchburyi</i> (cockle)	66.1
<i>Paphies australis</i> (pipi)	24.2
<i>Turbo smaragdus</i> (cat's eye)	7.2
<i>Cominella adspersa</i>	.1
<i>Cominella glandimormis</i>	.1
<i>Perna canaliculus</i> (mussel)	.7
<i>Pecten novaezelandiae</i> (scallop)	.2
<i>Ostrea lutaria</i> (oyster)	.1
<i>Melagraphia aethiops</i>	.1
Miscellaneous incidental shells	1.0

The species are typical of the shellfish population present at adjacent beaches to this site and it is likely that all shellfish in the midden were collected from the immediate vicinity.

A sample of bone from Layer 2 revealed that *Chrysophrys auratus* (snapper) and *Dasyatis brevicaudatus* (stingray) were present; sheep, cow and pig bones were in samples from small European rubbish dumps uncovered during excavation. Dog, ray and small quantities of *Phocarctus hookeri* (sealion) bones were also recovered.

LITHIC ANALYSIS OF MATERIAL FROM PLATFORM

A total of 275 stones pieces were retrieved from the platform. Material recovered from Layer 1 on the platform was from the easternmost portion of the area excavated where midden, including stone flakes, had been incorporated with the fill used to extend the garden in recent years; thus it derived from an earlier layer elsewhere on the site (Table 2).

Table 2. Identification of stone pieces by layer.

Stone type	Excavation on Platform			Total
	Layer 1	Layer 2	Layer 3	
Greywacke	14	45	152	211
Sandy greywacke	1	7		8
Sandstone	1	1	7	9
Quartzite	1			1
Local volcanic	3			3
Scoria		3	8	11
Jasper		1		1
Obsidian	5	9	12	26
Hematite		2	3	5
				275

Greywacke accounts for 76% of the stone material. This rock is available from several sources in the Auckland area, the nearest to the site being Motutapu Island or Waiheke Island. Waitemata sandstone is readily available on this part of the coast. Five pieces of menatite-rich rock (red ochre) were also retrieved. These rocks were classified as such by P. Black (pers.comm.) and it is likely that the red colouring derived from them was as effective as a colouring agent as hematite clay. Table 3 sets out the breakdown of used stone pieces into various categories by layer.

Table 3. Used stone pieces by layer.

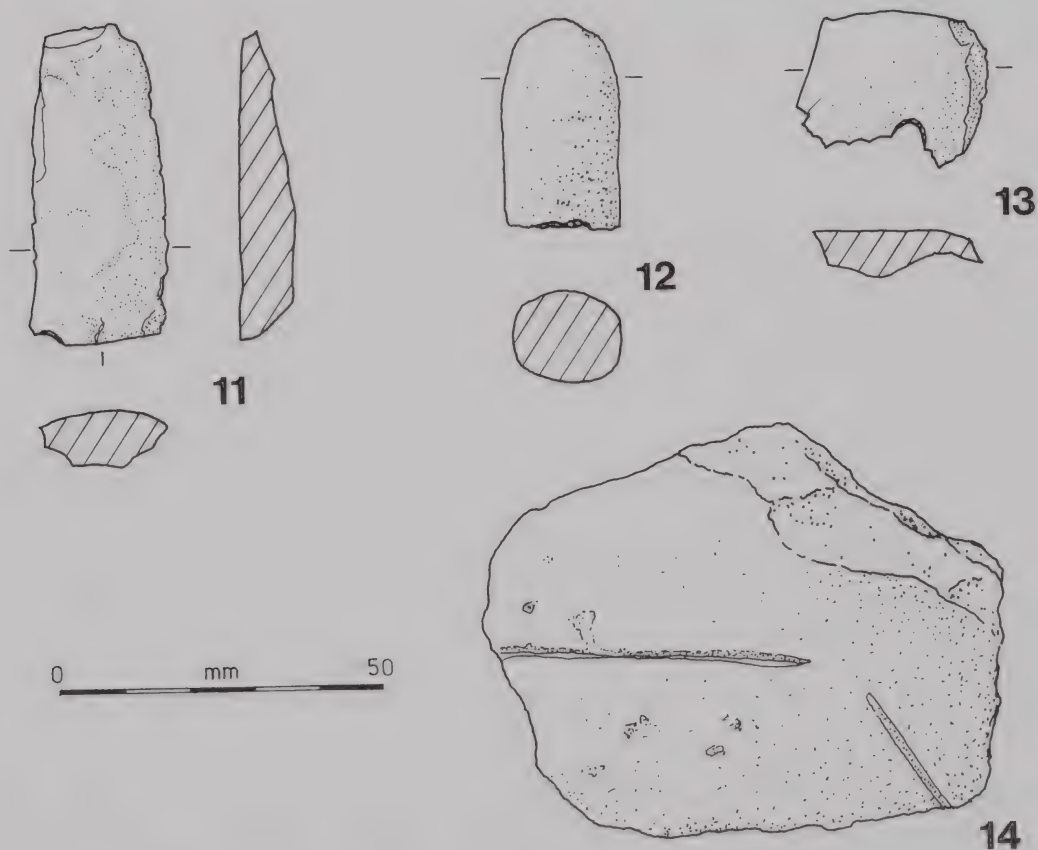
Layer	Artefact	Hematite-rich rock	Polished greywacke flake	Obsidian with used edge	Greywacke flake with used edge
1	—	—	3	1	1
2	Grooved sandstone Sandstone file				
3	Chisel	4	3	4	11

The end of a sandstone file (Fig. 12) and a piece of sandstone with a groove 1 mm wide and 43 mm long (Fig. 14) were recovered from Layer 2. From Layer 3 in the fill of Pit 3, a chisel of greywacke was retrieved (Fig. 11). This chisel was complete and was 50 x 22 x 8 mm, with a rectangular cross-section. The chisel had been shaped by flaking

and there was no evidence of hammer dressing; it was partially polished on the front, the back and the blade. The cutting edge of the blade was very blunt, with one large flake removed which suggests that it may have been broken in use.

A total of 27 pieces of obsidian was excavated with use-wear on seven flakes (26% of the obsidian assemblage). Three pieces of obsidian were of a green colour and two a red-brown colour, as observed in transmitted light; the remainder were grey. It is probable that the green obsidian came from Kaeo area (R. Brassey, pers. comm.). Many grey obsidian pieces contained a weathered outer cortex with a combed appearance which probably originated from a detrital deposit (R. Brassey, pers. comm.). Such deposits occur at Kaeo, Great Barrier Island and Cooks Bay (Ward 1973:95). Red-brown obsidian is found in the central North Island and also in Northland and on the east coast of the Coromandel Peninsula (Ward 1973:99).

Edge damage on all the used obsidian flakes was unifacial, in keeping with the majority of obsidian assemblages from New Zealand. This is interpreted as being caused through a scraping action (Moorwood 1974:12).



Figs. 11-14. Artefacts from Te Pane o Horoiwi. 11. Chisel. 12. File. 13. Flake. 14. Sandstone with groove.

A total of 211 pieces of greywacke was recovered. Use-wear was visible on 12 flakes. The damage on 5 of the used flakes consisted of a very concave and blunted working edge (one of which is illustrated as Fig. 13) suggesting that all may have been used for the same purpose, which could have been the whittling of small sticks. The analysis of use wear on the obsidian and greywacke assemblage is set out in detail in Sewell (1984).

While use-wear was recorded on only 12 greywacke flakes it is possible that a much higher proportion of the flakes were used and the tasks to which they were put resulted in little visible damage to the used edges. Davidson (1970a:51) in discussing the analysis of use-wear on greywacke flakes from N38/37 on Motutapu Island said "experimentation showed that flakes could be used for cutting soft material without leaving visible sign of use on the edge suggesting that most flakes could have been used for purposes such as food preparation and that only those employed in working harder material show visible signs of use."

DISCUSSION AND CONCLUSIONS

The majority of excavations on Auckland's volcanic cones have taken the form of salvage excavations — to learn something of the construction of the defences prior to destruction by quarrying, reservoir installation and the like. To date only a limited number of such excavations have been fully reported. This makes comparison difficult between the defences on Te Pane o Horoiwi and those of other cone pa.

Excavations on Mount Wellington, Mount Roskill, Taylor's Hill, One Tree Hill, Wiri Mountain and Ellett's Mountain have revealed a complex sequence of occupation, including levelling and terracing, digging and redigging of storage pits and fortifications reflecting several hundred years of occupation and modification rather than a single construction phase (Davidson 1982:36). The excavations at Te Pane o Horoiwi indicate that occupation was similarly complex.

Fortifications of Auckland's cone pa are diverse, some with substantial earthworks and others with none. The strongpoints of Mount Hobson, Mount Wellington, One Tree Hill and Mount St. John were relatively small and were defended by a transverse ditch in each case. Excavation of a portion of the summit of Mount Roskill showed that the citadel was defended by a double row of palisades (Fox 1980:48) and palisades were also present on some of the large lateral terraces on One Tree Hill (Bulmer, pers. comm.). Excavations on Mount Wellington suggest that only a small portion of the summit was defended; the lower terraces on that cone and on Taylor's Hill contained no evidence of palisading (Davidson 1982:38).

Although investigations of the strongpoints of Auckland cone pa are few, forms of defence chosen for each cone were those most suited to the landform of that particular cone. The ditch surrounding two sides of the citadel of Te Pane o Horoiwi may have been extensive in terms of labour involved but, as Davidson (1982:38) has suggested, the lack of sufficiently large trees to be used as palisade posts may have resulted in the digging of ditches being a more economic proposition.

The lack of palisading on Terrace 4 is similar to results from Mount Wellington and Taylor's Hill where no palisades were found on lower terraces. It is likely, therefore, at least in these cases, that only a small portion of the cone was fortified and, as Davidson (1978:6) suggests, the concept of a cone pa with palisading on every terrace may well be erroneous.

The defences of the citadel of Te Pane o Horoiwi consisted of ditches and banks with natural cliffs on three sides; the fourth side was defended by a row of palisades on top of a bank and associated artificially steepened scarp. The sides of the palisade posthole from the first period of activity were not parallel, suggesting that the hole was dug at a sloping angle to allow the post to be slid in place, packed around with sandstone pieces, then brought up to a more perpendicular angle. This method of erecting heavy posts is illustrated in Best (1975:82). The bank was then constructed around the *in situ* palisade post. Such construction would hold the post firmly in position and minimise the risk of its being pulled out during attack by the enemy. The erection of palisade posts in this manner is recorded by Fox at Te Awanga, Hawkes Bay (Fox 1978:12). Bulmer (1983:45) also reported on the digging of palisade postholes prior to construction of a defensive bank at Waitete. Doubtless other posts of similar construction and purpose existed beyond the bounds of this excavation, possibly along the whole of the eastern edge of the platform. The construction of the bank was similar to the defences excavated at Maiore (Fox & Green 1982:76) where the natural slopes were steepened by scarping and the soil obtained heaped up around the base of the palisade. In the area with least natural defences at Maiore soil was quarried from the foot of the scarp to make a higher bank across the ridge.

Comparison of the pits from the third period of activity at Te Pane o Horoiwi with pits dug into clay or clay-like substrata on other cone sites in the Auckland area indicates similarity in construction — e.g. N38/30 (Leahy 1970, 1972), N38/37 (Davidson 1970a), N42/137 (Davidson 1970b) and N42/114 (Law 1970). Law commented (1970:98) that the sump-like feature excavated at N42/114 (Alberon Park) did not readily allow water infiltration, rather collection. The sump and exit drain in Pit 3 would have effectively facilitated water removal. The exit drain was in the form of a tunnel, of similar construction to those at Hamlin's Hill (Nichol 1980:216). Marks of digging sticks used to construct the sump and associated drain were clearly visible. Within the sump itself was a considerable quantity of hematite-rich clay. Law (1970:97) reported the presence of red ochre in each of the pits excavated at Alberon Park. The reason for the presence of red ochre in these pits is unknown.

Faunal material recovered is typical of inner harbour sites with a predominance of cockles and pipi. The presence of snapper and stingray suggests the fishing activities of Te Pane o Horoiwi were similar to other sites in the Auckland area. Sealion bone from Layer 2 is interesting. While all early sites in the Auckland area have small quantities of seal and sealion no such bones have yet been recorded from later sites (I. Smith, pers. comm.). However as there have been no detailed studies of the economy of the people who lived on Auckland's cone pa this in itself may not be unusual or indicative of an early date.

Four periods of activity were revealed which demonstrated that there had been several major changes in the character of occupation of the upper platform as set out in Table 4.

Table 4. Relationship between stratigraphic layers and periods of activity.

Layer	Period of activity
1A	European modification 1980s
1B	European modification 1970s
1C	European modification 1930s
2	Period 4 — postholes and firescoops Deposition of midden
3	Pits filled in with dark brown soil mixed with redeposited Waitemata sediment Period 3 — suggestion of pits dug into redeposited weathered Waitemata sediment Area filled with redeposited weathered Waitemata sediment and levelled to top of the bank Period 2 — drain complex Period 1 — defensive bank and associated palisade post constructed
4	Natural sub-strata — weathered Waitemata sediment

During the first period of activity emphasis was centred on defence of the citadel. An artificially steepened scarp and an earth bank were constructed on the side of the citadel not defended by natural cliffs or by a ditch and bank. The one palisade posthole excavated from this period of activity indicated that firstly the post was dug into position and the bank was then constructed around the erected post.

The citadel was apparently undefended during the second period of activity. The main feature from this period was a large drain which breached the defensive wall. It is likely that the drain complex related to a structure or structures beyond the bounds of the excavation.

During the third period, activity was concerned with the construction of food storage pits and not with defence. The features from the final period of activity were dug into a living floor of compacted shell midden. Emphasis was again centred on defence of the citadel. The alignment of postholes within the defended area suggests that a house or small structure was also constructed.

Lack of traditional knowledge of occupation of this pa by the Ngati Whatua would appear to indicate a date for termination of occupation prior to the mid-eighteenth century, suggesting that the pa was a Waiohua fortification.

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